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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,061	03/19/2004	Tsuyoshi Aoki	040141	8249
23850	7590	06/06/2005	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006			TRA, TUYEN Q	
			ART UNIT	PAPER NUMBER
			2873	

DATE MAILED: 06/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/804,061	AOKI ET AL.	
	Examiner	Art Unit	
	Tuyen Q. Tra	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-10, 12-15 and 21-25 is/are allowed.
- 6) ☒ Claim(s) 1-4, 11 and 16-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-4 and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Smith et al. (U.S. Pat. 2003/0063884 A1).

- a) With respect to claim 1, Smith et al. et al. discloses an ultra-wideband photonic band gap crystal having selectable and controllable band gaps and methods for achieving photonic band gaps in Figure 17 comprising of a core layer (item 162) containing photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a two-dimensional directions; and electrodes (item 170) for applying an electric field to the core layer (162); and a clad layer (item 164) on both sides of the core layer containing photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a one-dimensional direction or two-dimensional directions (paragraph [0138], lines 4-6).
- b) With respect to claim 2, Smith et al. further discloses wherein polarization axes of the ferroelectric members in the core layer stand upright along a thickness direction of the core layer.

- c) With respect to claim 3, Smith et al. further disclose wherein a clad layer (164,166) disposed on both sides of the core layer (162) and sandwiching the core layer (162), an effective refractive index of the clad layer being smaller than an effective refractive index of the core layer.
- d) With respect to claim 4, Smith et al. further discloses wherein the clad layer has a periodical structure having regions of different refractive indices disposed periodically.
- e) With respect to claims 11, Smith et al. further discloses wherein the first member is made of ferroelectric material having a piezoelectric effect and the second member is made of material softer than the first member.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jasper et al. (U.S. Patent 5,739,796 A), in view of Smith et al. (U.S. Pat. 2003/0063884 A1).

a) With respect to claim 16, Jasper et al. discloses an ultra-wideband photonic band gap crystal having selectable and controllable band gaps and methods for achieving photonic band gaps in Figure 17 comprising of a core layer (item 162) including a first member (item 5) disposed periodically along a one-dimensional direction or two-dimensional directions and a second member filled in between the first members, the

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first and second members constituting a photonic crystal, and at least one of the first and second members being made of a substance having a character that a refractive index is changed upon generation of an electric field; and electrodes for applying an electric field to the core layer (reference claim 43).

However, Jasper et al. does not teach wherein the clad layer contains photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a one-dimensional direction or two-dimensional directions. Within the same field of endeavor, Smith et al. discloses an optical system in Fig. 17 with a clad layer (item 164) on both sides of the core layer containing photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a one-dimensional direction or two-dimensional directions (paragraph [0138], lines 4-6).

It would have been obvious, therefore, at the time the invention was made to a person having skill in the art to construct the ultra-wideband photonic band gap crystal having selectable and controllable band gaps and methods for achieving photonic band gaps with the core layer such as disclosed by Jasper et al. and with a clad layer containing photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a one-dimensional direction or two-dimensional directions such as disclosed by Smith et al., for purpose of measuring target image.

b) With respect to claim 17, Jasper et al. further discloses wherein the first member is made of ferroelectric material having a piezoelectric effect and the second member is made of material softer than the first member.

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c) With respect to claims 18 and 19, Jasper et al. further disclose wherein each of the ferroelectric members constituting the core layer extends from one surface to the other of the core layer, and the electrodes are disposed sandwiching the core layer and directly contact each of the ferroelectric members; wherein the ferroelectric members constituting the core layer are aligned in such a manner that directions of one of (001), (110) and (111) planes of the ferroelectric members are uniform.

c) With respect to claim 20, Jasper et al. further disclose wherein a clad layer disposed on both sides of the core layer and sandwiching the core layer, an effective refractive index of the clad layer being smaller than an effective refractive index of the core layer.

Allowable Subject Matter

5. Claims 5-10, 12-15 and 21-25 are allowed.

The reason for the indication of allowable subject matter is that (claim 5) a clad layer disposed on both sides of the core layer and sandwiching the core layer, an effective refractive index of the clad layer being smaller than an effective refractive index of the core layer; the clad layer contains photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a one-dimensional direction or two-dimensional directions; (claim 12) a first optical filter; and a second optical filter upon which a laser beam transmitted through the first optical filter becomes incident, wherein each of the first and second optical filters comprises: a core layer containing photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a one-dimensional direction or

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two-dimensional directions; and electrodes for applying an electric field to the core layer, and wherein band gaps of the photonic crystals of the first and second optical filters are apart from each other by a wavelength interval; (claim 14) a laser oscillator for radiating a laser beam having wavelength distributed in a range from a first wavelength to a second wavelength; a first optical filter upon which the laser beam radiated from the laser oscillator becomes incident; and a second optical filter upon which a laser beam transmitted through the first optical filter becomes incident, wherein each of the first and second optical filters comprises: a core layer containing photonic crystals formed by ferroelectric members made of a ferroelectric substance and periodically disposed along a one-dimensional direction or two-dimensional directions; and electrodes for applying an electric field to the core layer, and wherein band gaps of the photonic crystals of the first and second optical filters are apart from each others by a wavelength interval and partially overlap the range between the first wavelength and the second wavelength; (claim 21) a first optical filter; and a second optical filter upon which a laser beam transmitted through the first optical filter becomes incident, wherein each of the first and second optical filters comprises: a core layer including a first member disposed periodically along a one-dimensional direction or two-dimensional directions and a second member filled in between the first members, the first and second members constituting a photonic crystal, and at least one of the first and second members being made of a substance having a character that a refractive index is changed upon generation of an electric field; and electrodes for applying an electric field to the core layer, and wherein band gaps of the photonic crystals of the first and

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second optical filters are apart from each other by a wavelength interval; (claim 23) a laser oscillator for radiating a laser beam having wavelengths distributed in a range from a first wavelength to a second wavelength; a first optical filter upon which the laser beam radiated from the laser oscillator becomes incident; and a second optical filter upon which a laser beam transmitted through the first optical filter becomes incident, wherein each of the first and second optical filters comprises: a core layer including a first member disposed periodically along a one-dimensional direction or two-dimensional directions and a second member filled in between the first members, the first and second members constituting a photonic crystal, and at least one of the first and second members being made of a substance having a character that a refractive index is changed upon generation of an electric field; and electrodes for applying an electric field to the core layer, and wherein, band gaps of the photonic crystals of the first and second optical filters are apart from each other by a wavelength interval and partially overlap the range between the first wavelength and the second wavelength; (claim 25) forming a resist film on a substrate; forming openings in the resist film, the openings being disposed periodically along a one-dimensional direction or two-dimensional directions; filling precursor solution of a ferroelectric substance in the openings and drying the solution to form precursors; removing the resist film; and baking the precursors to form ferroelectric members disclosed in the claims is not found in the prior art.

RESPONSE TO APPLICANT'S ARGUMENT

6. Applicant's arguments with respect to claims 1-4, 11 and 16-20 have been considered but are moot in view of the new ground of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuyen Tra whose telephone number is (571) 272-2343. The examiner can normally be reached on Monday to Thursday from 8:30am to 6:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps, can be reached on (571) 272 - 2328. The fax number for this Group is (703) 872-9306.

tt

May 23, 2005


Hung Xuan Dang
Primary Examiner